REMARKS

The Applicants respectfully request reconsideration of the present application in view of the following reasons.

I. Status of the Claims

By way of this Amendment and Reply, Claim 12 has been amended to correct a minor informality, and new Claim 46 has been added. No new matter has been added. Support for new Claim 46 can be found, for example, in currently-pending claims and in paragraphs [0028] and [0029] of the published application (Pub. No. 2006/0272701).

Upon entry of the above amendment, Claims 1-23 and 43-46 will be pending, with non-elected Claims 6, 8, 13, and 19 withdrawn from consideration. The Applicants note that in the previous Office Action, Claim 20 was listed as withdrawn and Claim 19 was listed as rejected. However, in the instant Office Action the Examiner suggested that Claim 19, not 20, was withdrawn from consideration. Accordingly, the claim status identifiers have been revised to reflect this change.

II. Claim Rejection Under 35 U.S.C. § 102

In Section 7 of the Office Action, Claims 1-5, 7, 9, 10, 17, 21, 22, and 43-45 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by WO 98/39250 to Smalley (hereinafter "Smalley"), and the Office has used an article by Garg et al., "Effect of chemical functionalization on the mechanical properties of carbon nanotubes," Chem. Phys. Lett., October 16, 1998, 295, 237-278 (hereinafter "Garg") to provide supporting evidence. For at least the following reasons, the Applicants respectfully traverse this rejection.

Independent Claim 1 recites, among other elements, "photovoltaic organic molecules attached to **defect sites on the carbon nanotubes**." Claim 43 additionally recites that "the defect sites are located **along the carbon nanotube bodies**." Independent Claim 45 also recites "photovoltaic organic molecules attached to **defect sites along the carbon nanotube bodies**." (Emphases added.)

In contrast, Smalley does not disclose at least these features. On page 3 of the Office Action, the Office asserted that Smalley teaches, "the ends of the nanotubes are chemically

functionalized/derivatized and therefore forms defect sites at the ends" and "the dyes are bonded to the ends, i.e., defect sites."

The Office further stated, "Smalley further teaches that the defect sites are located *along the carbon nanotube bodies (at the end of the carbon nanotube bodies)*" (emphasis added). Applicants disagree. Although the Office must give the claims their broadest reasonable interpretation, this does not mean that the claims can be given incorrect interpretations. Rather, the broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999). In this case, no one of ordinary skill in the art would interpret "along the carbon nanotube bodies" as "at the end of the carbon nanotube bodies."

Furthermore, as the Applicants have previously argued, neither Smalley nor Garg teaches, nor is it known in the art, that the "ends" of carbon nanotubes are the same as the "defect sites" of the carbon nanotubes. In fact, Smalley uses single-wall carbon nanotubes precisely because they are substantially defect free. *See e.g.*, page 8, lines 20-27.

On page 10, in "Response to Arguments" of the Office Action, the Office asserted that "Smalley on page 31 only discloses that only the cylindrical grapheme sheet by itself is defect-free (page 31, line 10), but not the overall structure as shown by formulae I, II and III (page 31, line 5)." However, this statement contradicts the statement on the same page, that "defect sites are formed *at the ends* as evidenced by Garg."

In view of the above, Smalley, alone or as supported by Garg, does not disclose each and every element recited in present independent Claims 1 and 44. Thus, the teachings of Smalley (and Garg) cannot anticipate independent Claims 1 and 44 and their respectively associated dependent claims. Accordingly, the Applicants respectfully request that the rejection be withdrawn.

III. Claim Rejections Under 35 U.S.C. § 103

In Section 9 of the Office Action, Claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Smalley as applied to Claim 1, and further in view of Gopidas et al., "Photophysics and photochemistry of phenosafranin dye in aqueous and acetonitrile solutions," Photochem. Photobiol, A: Chem., 1989, 48, 291-301 (hereinafter

"Gopidas"). In Section 10 of the Office Action, Claims 14-16 and 18 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Smalley as applied to Claims 1 and 5, and further in view of U.S. Patent No. 6,084,176 to Shiratsuchi et al. (hereinafter "Shiratsuchi"). In Section 11 of the Office Action, Claim 20 was rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Smalley as applied to Claim 1, and further in view of U.S. Patent No. 6,353,777 to Bulovic et al. (hereinafter "Bulovic"). In Section 12 of the Office Action, Claim 23 was rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Smalley as applied to Claim 1, and further in view of U.S. Patent No. 4,611,914 to Homma (hereinafter "Homma"). For at least the following reasons, the Applicants respectfully traverse these rejections.

As discussed above, Smalley does not teach or suggest at least the "photovoltaic organic molecules attached to defect sites on the carbon nanotubes" as recited in present Claim 1. The teachings of the secondary references Gopidas, Shiratsuchi, Bulovic, and Homma, whether considered separately or in a combination, do not to remedy the deficiency of Smalley's teachings. Furthermore, the Applicants respectfully submit that one of ordinary skill in the art would not have had a reason to combine the teachings of Smalley with the teachings of these secondary references, or to modify the systems disclosed therein to arrive at the presently claimed embodiments. In fact, Smalley teaches "substantially defect-free" carbon nanotubes, and thus teaches away from the presently claimed embodiments where the defect sites are utilized to have photovoltaic organic molecules attached thereon. Moreover, the "photoactive dye" of Smalley is designed to be attached to "the end of each nanotube," and not the "defect sites" as recited in the present claims.

Further, if the device of Smalley were modified to have defects on the carbon nanotubes and photovoltaic organic molecules attached to the defect sites, the modification would render the carbon nanotubes of Smalley unsatisfactory for their intended purpose. This is because the defects can no longer be exploited to cut the nanotubes into smaller pieces, resulting in substantially defect-free nanotubes as desired by Smalley. Thus, no *prima facie* obviousness can be established. *See* MPEP § 2143.01 (V) (stating that if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.)

Furthermore, as discussed above, by asserting, "Smalley on page 31 only discloses that only the cylindrical grapheme sheet by itself is defect-free... but not the overall structure...," the Office appears to be interpreting Smalley as teaching carbon nanotubes having substantial amount of defects along their bodies. This is not true. If the carbon nanotubes of Smalley had substantial amount of defects along their bodies, during the process as taught by Smalley, the carbon nanotubes would have been cut at these defects, effectively shredding the bodies of the carbon nanotubes and leaving essentially no tubes.

In sum, the teachings of Smalley, Gopidas, Shiratsuchi, Bulovic, and Homma cannot be properly combined. Even assuming, *arguendo,* that they were combined, the combined teachings would not teach or suggest all of the elements recited in present independent Claim 1. Thus, Claim 1 and its corresponding dependent claims are patentable over the teachings of these references.

Accordingly, the Applicants respectfully request that the rejections be withdrawn.

IV. Double Patenting

In Section 14 of the Office Action, Claims 1-5, 7, 9-12, 14-19, 21-23, and 43-45 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over Claims 1-38 of copending Application No. 10/537,942.

The Applicants respectfully request that this provisional rejection be held in abeyance until the double patenting rejection becomes the only remaining rejection, at which time the Applicants request that the Office contact the undersigned to discuss options to overcome the rejection.

V. Rejoinder

As discussed above, the Applicants believe that Claim 1 is allowable. Withdrawn Claims 6, 8, 13, and 19 depend from Claim 1, and thus should also be allowable for at least the reasons discussed above with respect to Claim 1. Accordingly, the Applicants respectfully request rejoinder and allowance of Claims 6, 8, 13, and 19.

VI. New Claim 46

Newly added Claim 46 is directed to a solar cell, and includes all the elements of independent Claim 1. In addition, Claim 46 recites, "the defects are acid treatment induced or anionic treatment induced." In contrast, the references cited in the Office Action teach avoiding defects in the first place, let alone "inducing" such defects. Thus, Claim 46 is patentable over the cited references for at least this reason, in addition to the reasons set forth above with respect to Claim 1.

Accordingly, the Applicants respectfully request entry and allowance of new Claim 46.

CONCLUSION

The Applicants believe that the present application is now in condition for allowance, and thus respectfully request favorable reconsideration of the application.

The Office is invited to contact the undersigned by telephone if a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date March 1, 2011

By [signature] Reg # 59,349

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5300
Facsimile: (202) 672-5399

Stephen B. Maebius
Attorney for the Applicants
Registration No. 35,264